THE

NATIONAL GEOGRAPHIC MAGAZINE

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WASHINGTON GEOGRAPHIC SOCIETY

FOR SALD OF BRENTANDS

II DERON SELSER, NEW YORK; 1005 PERSONALINAMA AVERLE, WASHINGTON; IS WARREND AVERTE, CHICAGO, 37 AVENUE DE L'OFERA, PARIS

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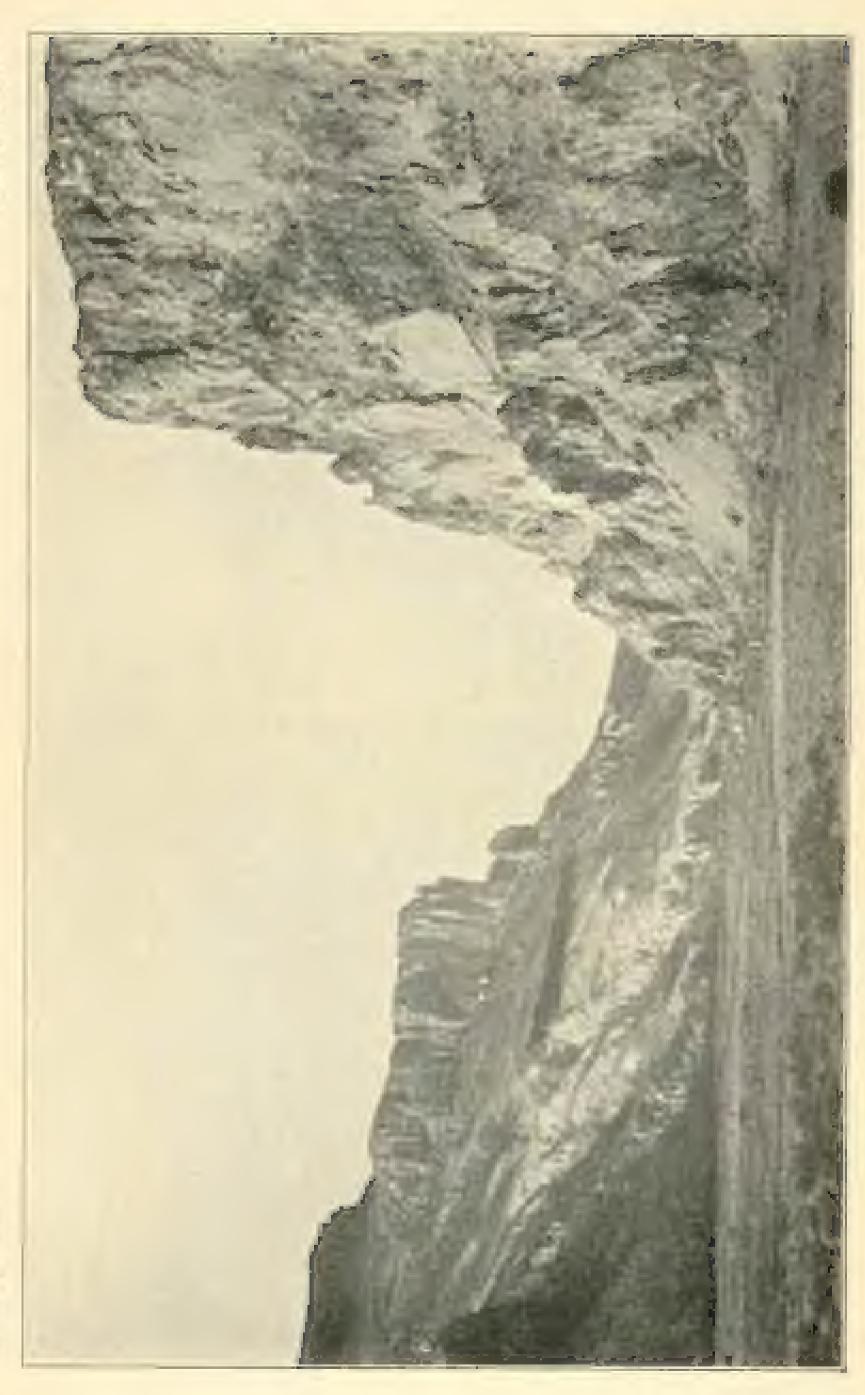
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The list of contributors to the Nagronat Groossarous Managers includes nearly every United States either whose name has become identified with Arctic exploration, the Bering Sea controversy, the Ataska and Vereingth boundary disputes, or the new commercial and policial questions arising from the acquisation of the Philippines.

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- "The Native Tribes of Paugotia," by Mr J. R. Bale as of Princeton University.
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NATIONAL GEOGRAPHIC MAGAZINE

You XI

PERREARY, 1900

No. 2

SOME GEOGRAPHIC FEATURES OF SOUTHERN PATA-SONIA, WITH A DISCUSSION OF THEIR ORIGIN

By J. B. HATCHER

Princelos Conteening

In the following pages I shall attempt to describe in as clear and concise a manner as possible the principal geographic features of that part of l'angonis lying beyond the 46th parallel of south latitude as they presented themselves to me during my travels in that country the past three years while engaged chiefly in paleontologic and geologic researches in behalf of Princeton University. I shall also give a brief description of the geology of the region as a basis for a more extended discussion concerning the agencies which have contributed to produce the anisting somewhat unusual not to say unique drainage arcters of Palagonia. I shall not attempt an illustrary of my explorations in the progress of which I consect and receives that I undertake to describe in detail the geography of any particular part of the region.

The attention of the traveler in Paragonda, If he is endowed with any of the instincts of a naturalist is first attracted to the long line of chills that everywhere on the eastern court rise boldly from the sea to a height of from 300 to 500 feet. While still fix out at sea this is discernible to the experienced eye of the navigator, though to the hardenen it may appear as a low cloud or foguesiak, to either of which itindens its assaily unbroken amount and duil gray cohere freely lend themselves. As the vessel approaches some one of the few harbors of this coast, commonly hearted at the months of rivers, its true majore soon becomes appearent, and it develops as a great sea its true majore soon becomes appearent, and it develops as a great sea

reall stretching for away on either hand until best in the northern neel southern horizons. This line of idults extends throughout the entire eastern count of Patagonia, with but occasional interruptions at the mouths of the few rivers that, flowing eastward from the Andes a ross the plains, discharge their waters into the Athentic

The rocks forming the cliffs consist of alternating layers of sandsiones and clays, approximately though not entirely horizontal, of a
premiling light brown or gray color, and cretywhere remarkably free
from any faults or other disturbances. Although the color and lithological characters of the rocks are quite similar throughout the entire
coast line, yet there is a decided difference in their age and origin,
as shown by the fassils contained in them, Toward the north the
entire series of strata belong to the Patagonian beds, of Middle Tertiary age and marine origin, and contain in great abundance the fostil
remains of cysters, pectias, beschlopeds beyondance and other actaceans, all bearing unimpeachable cystence as to their marine pature.

These touring bods attain their maximum development in the region of San Julian, where they show a thickness of 900 feet. From this point they dip very gootly to the southeast, as is demonstrated by the fact that the surceeding strata gradually dampear beneath the waters of the Atantie as we proceed southward along the const. So slight however, is this southerly slip that for more than Dammies only the Patagonian beds are even in the bluffs; but at a point about 40 miles south of the Santa Cruz River a second series of rocks of somewhat lighter color and composed of usually softer insterials appear at the summal conformably overlying the Patagonian beds.

This second series of strata constitutes the Santa Cruz bods, of lacustrine and acclian origin. It contains the remains of that rich and unique assemblage of fossil birds and moments concerning the age and relations of which there has been such wide discussion. Continuing southward along the coast the rocks of the Santa Cruz beds dip gently to the southeast, so that in the region of Cor Inlet their lowermost strata have reached the water level, while the entire series forming the Patagonian beds are here submorged beneath the waters of the Atlantic.

South of Coy Inlet as far as Cape Fairweather, the bluffs are emtirely composed of the Santa Crar beds. At Cape Fairweather norther series of rocks appears at the support unconformably overlying the Santa Crar beds and designated as the Cape Fairweather bees. They are of marine origin and contain, in great abundance, the remains of marine invertebrates. I should also add that throughs out the course extent of this course the uppermust crest of the bluffs is compassed of from 20 to 30 feet of unstratified boulders and rings, constituting the great Shingle formation of Patagonia, distributed somewhat uniformly over almost the source surface, and of perbably combined ice and aqueous origin.

With this basiv survey of the eastern coast lone, let us proceed into the saturiar. Ascending the bluif we emerge upon a broad elevated plain, stretching westward to the base of the Andes and altraptly terminated on the east, as we have soon, by the lofty escarpments of the ion. Its surface, with a thin veneer of soil vainty emissivering to conteed the rocks beneath, is sountdy covered with grass. Occasional brancs, oddom attaching a height of more than five or hix feet appear in specially favored localities. Bands of planace or South American camels, and flocks of there, the so-called testricly, feed here in great minuters and provide the chief sustenance of the Patagonian traveler, as also of the Patagonian Indian.

Scattered over the surface of the plants in considerable numbers are great depressions, or rather exervations, frequently several unites in diameter and from 100 to more than 1,000 feet in depth, as observed in some instances near the base of the Andes. The bottoms of those depressions are notally occupied by small saline takes. In periods of drought, which occur annually in this region, usually from December to April, the volume of water in such takes is much refused by evaporation, and beds of almost pure salitare precipitated, secasionally attaining a talekness of several feet.

An examination of the depressions occupied by such lakes reveals the fact that the bluffs on one sule are always anch lower than those on the other sides, and, further that the lower side elways lies toward the present drainage system of the particular region in which the lake is situated. All this leads to the interence that these are residently lakes, left as confined bodies of water at the third elevation of the land above sen-level, and, further, that the depressions are remained of former draining systems, existing prior to the last submergetter, and corresponding approximately, though not entirely, with those of today.

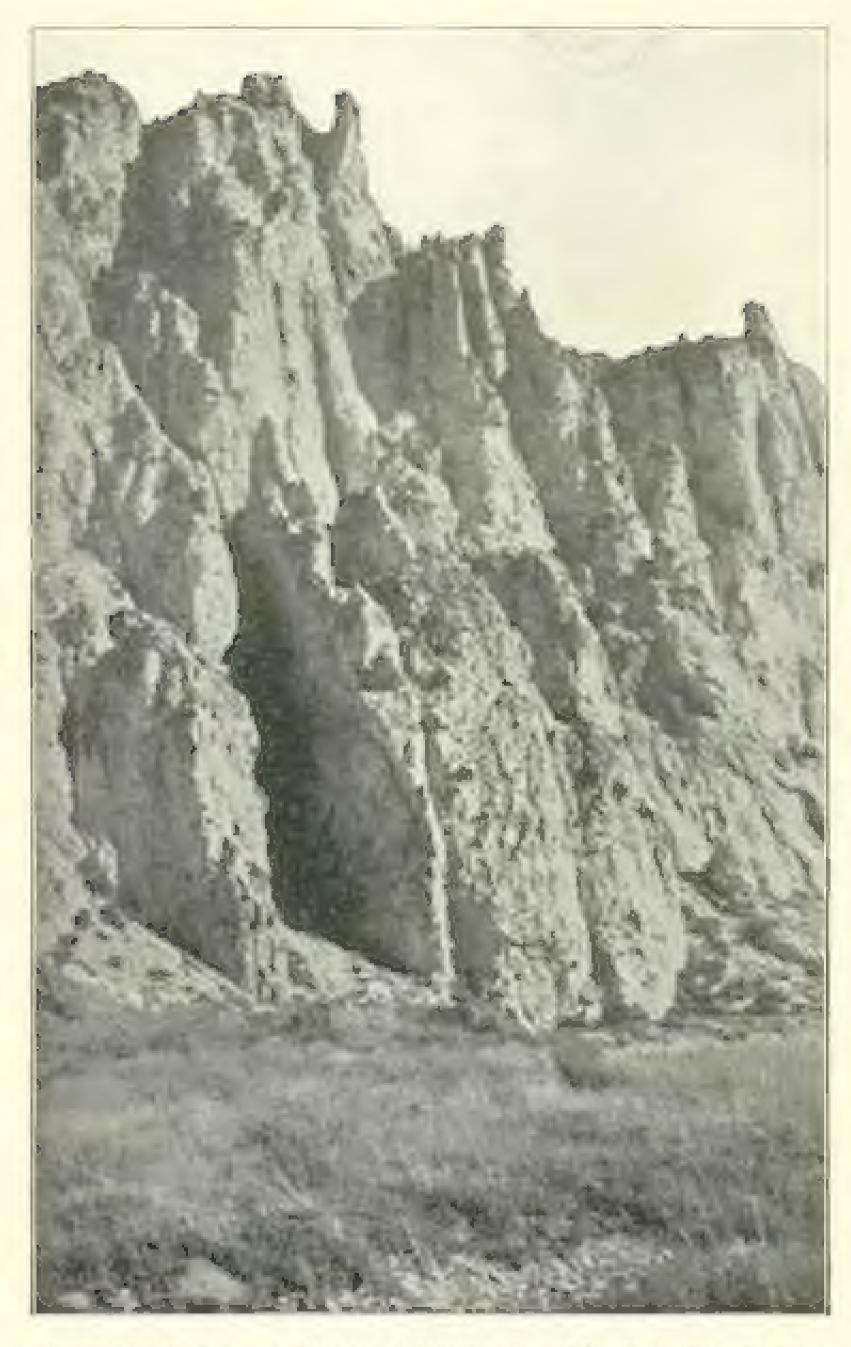
Other features to be noticed are the broad, deep, transverse valleys that cross Patagonia from west to east and form the chief desinage eventure. These are all true valleys of eresion, and along their hot-

croded though in some instances, like the Desire and Coy rivers, there are now only intermittent streams, while in the valley of San Julian no stream at present over flows, the waters of the original stream having been captured long since at a distance of about 100 miles from the reast by a numbers tributary of the Santa Puz. The latter considering the volume of its waters, is much the mess important of all the rivers of the pages of southern Panagonia.

Another tenture characteristic of these plants as the series of escurpments, often several bundred feel in march, that terminate a succession of breakons, uncountered at varying advantous as the proposts from the coast inhard westward toward the Andes, or also in crossing from north to south any of the great transverse valleys. Such escurpments have a general trend somewhat parallel with that of the propositions have but extend inland for many inless along either side of the valleys of all the more important watercourses, as do also the present bluffs of the sea. They are perhaps romanate of bluffs formed stong the coast at different stages during the former depression and late elevation of the hard, which would appear to have been intermittent and of which we have exhibited in the present bluffs of the sea the last stage. Someon each concessive escurpment a narrow, level plain extends, gradually increasing in altitude to the westward.

In many places over the plains the sedimentary rocks are covered with sheets of lava, which have usually had their origin to local dikes or volcauses. Many of the inter rise high above the autrounding plain as imposing landmarks, serving alike to guate the mayelor and lead variety to a rather monotonous landscape. These lava fields are most abundant over the central interior region, unloway between the Andes and the coast where they cover themseads of square miles. In some instances they present a broad level surface of almost thinsetable expanse, covered with highly vescular scories while at other times the surface over large areas is carried into a confusing inhymate of deep almost inaccessible, canons. In either case they present a most serious obstacle to the traveler.

While these have beds are most frequent over the central interior region, there is an important outlying area near the coast between the mouth of the Gallegos River and the eastern entrance to the Strait of Magellan, with several extinct volcanous and resulting lave streams, which appear to have been ejected at a comparatively



RADAMENT WALL OF CATES BY A MARRICALLY MY RESULTS COM- RESULTS FACE AND ALL DESIGNATION OF MARRIED BY MARRIOR, TERRESPONDENCES AS PROCESS.

From a photograph by J. W. Wolfdon



Print a philograph by J. B. Bellin

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by H C FRANKINGER ()

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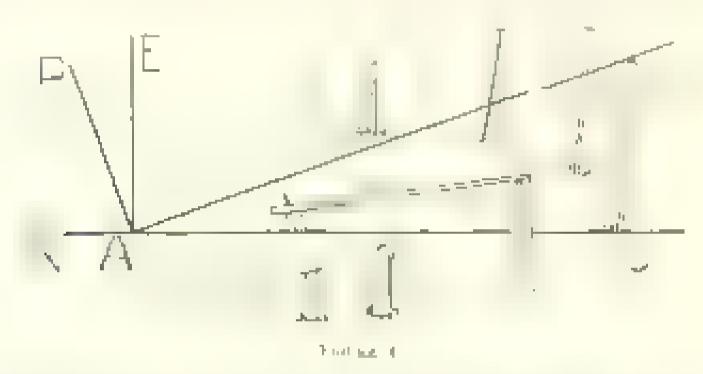
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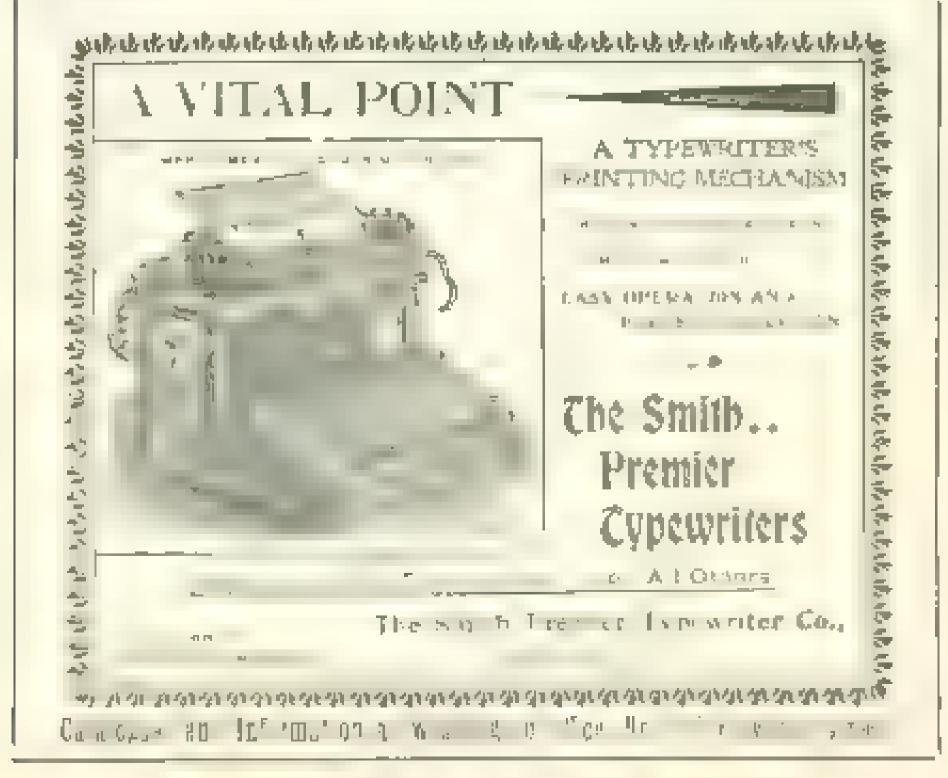
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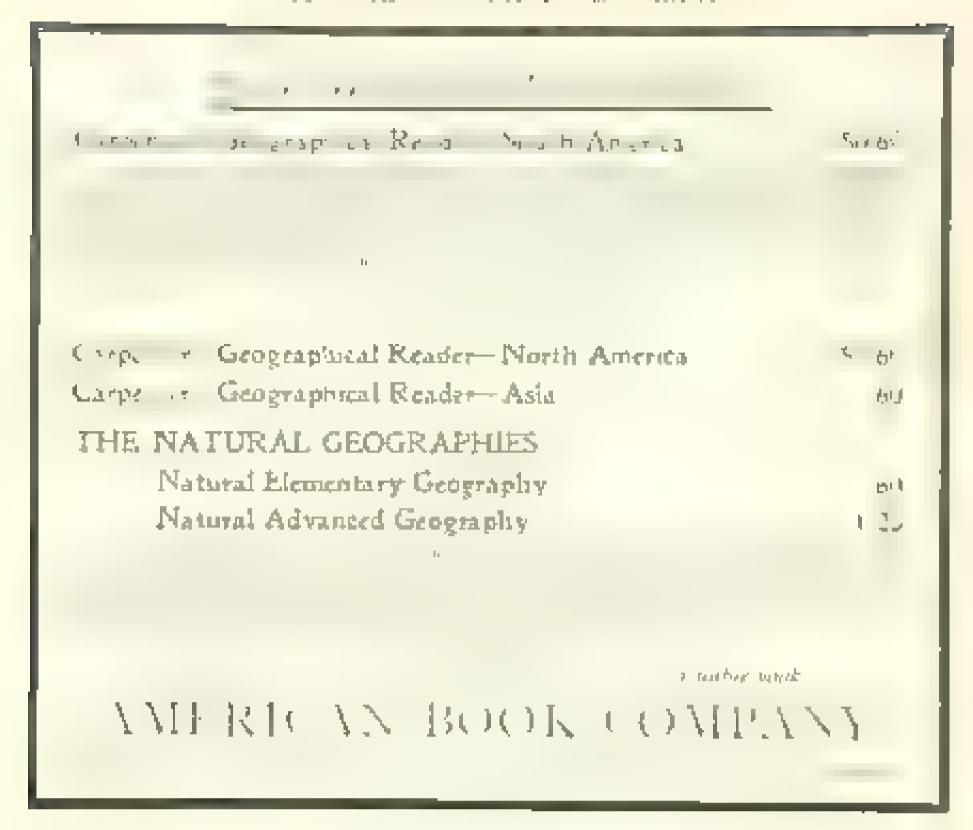
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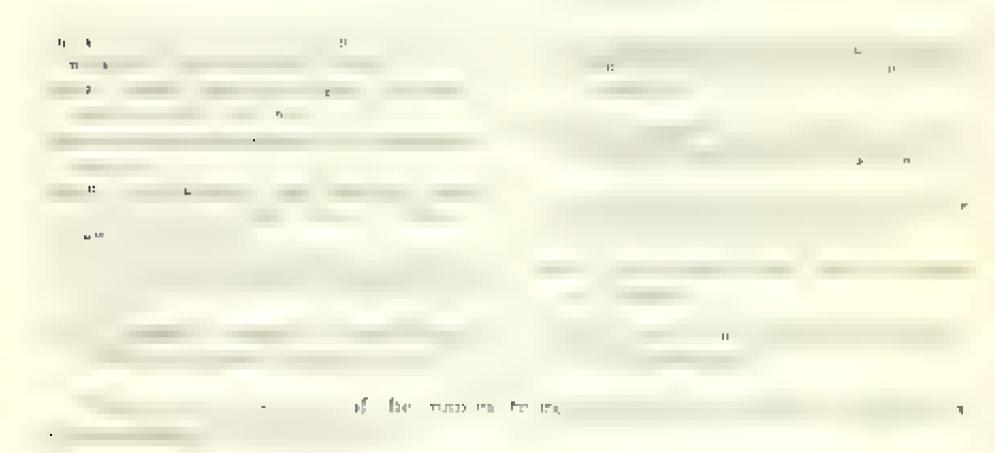
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MICHAEL HARRIST

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